CSI 9420 Wireless Vibration Transmitter

- *Accurate vibration monitoring in hard-to-reach locations via Emerson's Smart Wireless self-organizing network*
- *Provides overall velocity and PeakVue® measurements for one or two accelerometers*
- *Delivers vibration and temperature measurements through a single accelerometer with embedded temperature sensor*
- *Applicable to a wide range of plant machinery*
- *Wireless output with >99% data reliability delivers rich WirelessHART™ data, protected by best-in-class security*

The CSI 9420 delivers vibration information over a self-organizing wireless network for use by operations and maintenence personnel.

Overview

As part of Emerson's Smart Wireless solution, the rugged CSI 9420 Wireless Vibration Transmitter connects quickly, easily, and economically to any machine. It delivers vibration information over a highly-reliable, self-organizing wireless network for use by operations and maintenance personnel. Configuration, diagnostics, and alerts are imported into AMS® Suite: Intelligent Device Manager. Vibration data is also available in data historians or any control system for trending and analysis with other process parameters. In addition to measuring overall vibration and temperature, the CSI 9420 Wireless Vibration Transmitter includes PeakVue technology for advanced bearing and gear diagnostics.

AMS Device Manager provides an enhanced graphical interface through EDDL capabilities, giving you clear indication of device status.

High Accuracy and Reliability

The CSI 9420 is ideal for vibration monitoring applications, especially in hard-to-reach or cost-prohibitive locations. It provides advanced accuracy for all installations and ensures precise transmitter performance in harsh and/or noisy EMI/RFI environments. The CSI 9420 can be configured for a variety of low-power accelerometer sensor input options, including one accelerometer, one accelerometer with embedded temperature, or two accelerometers.

Configure and Diagnose with AMS Suite

Access all the predictive diagnostics in the CSI 9420 with AMS Device Manager. Use AMS Device Manager to configure, calibrate, diagnose, and document device activities. AMS Device Manager ensures a superior experience through EDDL capabilities that provide a consistent user interface between manufacturers and a graphical presentation of diagnostics. The enhanced graphical interface provides clear indications of device status and process variables, extending the benefits of PlantWeb® to WirelessHART devices.

Digital Field Devices Power PlantWeb

The CSI 9420 powers PlantWeb by communicating important vibration diagnostics and PlantWeb alerts to improve availability while reducing installation, operations, and maintenance costs.

SmartPower™

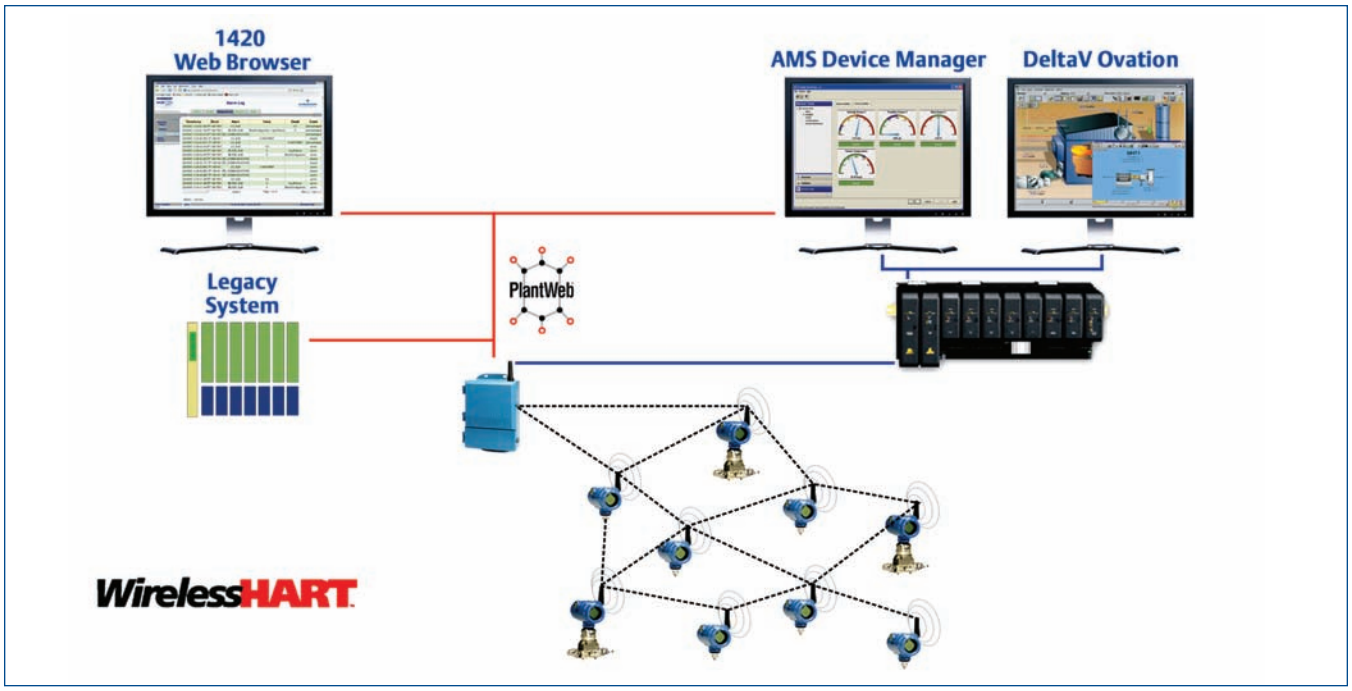
The CSI 9420 incorporates SmartPower to extend battery life while still delivering highly-reliable measurements with rich WirelessHART data and diagnostic information.

Rosemount® 648, 702 and 3051S Wireless Devices

These Rosemount transmitters enable fully-integrated temperature, pressure, flow, discrete, and level measurement wireless solutions that can be combined with the CSI 9420 vibration measurements to optimize plant performance and reduce risk.

Visible LCD Display

The LCD meter on the CSI 9420 conveniently displays sensor values and transmitter diagnostics. Local indication of vibration measurements and diagnostics provides real-time, accurate verification of process conditions. The LCD meter is easily visible, even in remote mount installations. Remote mount allows the CSI 9420 to be installed with sensors mounted directly on the asset.



At the heart of Emerson's Smart Wireless approach is the self-organizing network, featuring security, infinite configurability, and data reliability greater than 99%, to ensure an adaptive and flexible approach to wireless.

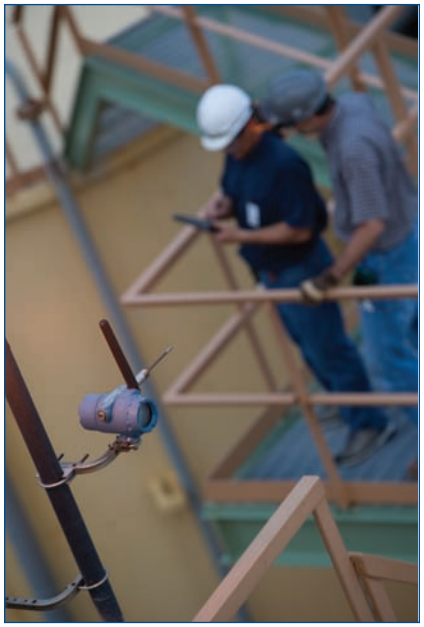
Wireless Architecture Overview

Best-in-Class Security Keeps Your Network Safe

Security is most effective if it can fend off attacks on multiple fronts. Emerson's multi-layered approach to wireless network security ensures that your network stays protected. The network devices implement encryption, authentication, verification, anti-jamming and key management methods to make sure that data transmissions are received only by your wireless gateway.

Maximize Data Reliability

The 1420 Smart Wireless Gateway enables the most robust security available. It provides easy host integration with no additional software and continuously optimizes network performance to maximize data reliability and battery life of the wireless devices.



CSI 9420 is an easy addition to your existing network of wireless pressure and temperature transmitters.

Network Stability
Emerson's Smart Wireless delivers greater than 99% data reliability. This is primarily enabled by the self-organizing nature of the technology platform. If a temporary obstruction blocks a direct connection, the network automatically reroutes the signal to an adjacent device, ensuring network reliability and data integrity.

Easy Installation
The CSI 9420 is easy to install and provides reliable measurement while delivering diagnostics data within hours of installation.

Integrates with existing HART Devices
The CSI 9420 uses the same tools and software as other HART devices, allowing you to leverage existing practices, training, and maintenance procedures without the added-wiring costs. These intelligent devices provide exceptional data reliability.

Seamless Integration to Host Systems
Send measurement data and diagnostics from your wireless devices to any type of information system, including Serial Modbus, Modbus TCP, OPC, legacy systems and data historians.

Are You Wireless?

The more control you have over the process, physical assets, and overall operations of your plant, the safer and more profitable your business can become.
As any plant manager, engineer, operator, or maintenance technician will tell you, more (and better) information means more opportunities for reducing operational costs and improving quality, throughput, and availability. In addition, plants are often struggling to get the measurement and diagnostic information that could ease compliance to new environmental and safety requirements.
So, why aren't more plants "measuring up?"

Too often, the cost or difficulty of adding new measurements has outweighed the perceived benefits. With traditional wired technologies, distance or complexity can make connecting a measurement point to the control system impractical or "too expensive to even consider."

The CSI 9420 removes the barriers of traditional wired field solutions by allowing you to monitor critical rotating machinery while gaining unprecedented access to data that was previously out of economic or technical reach.
A wireless solution can reduce, if not eliminate, these "blind spots" in your plant.

Lower installation costs are only part of the answer. Also important is **what you can do** with the additional information. Wireless technology empowers mobile workers to do their jobs more efficiently by giving them remote access to needed information.

With the CSI 9420, you can easily monitor your critical plant assets and gain access to information from all areas of your plant. With these predictive diagnostics, you will increase process uptime, improve consistency, and lower the risk of abnormal situations.

As more and more plants are turning to wireless solutions, the question is "Are You Wireless?"

Functional Specifications

Input

- Accelerometer 1
  - DC Bias Range: 2 - 3 Vdc
  - DC Input Range: 0 - 5 Vdc
  - AC Input Range: ± 2.5 Vpeak (100 gs peak)
- Accelerometer 2
  - DC Bias Range: 2 - 3 Vdc
  - DC Input Range: 0 - 5 Vdc
  - AC Input Range: ± 2.5 Vpeak (100 g's peak)
- Temperature 1
  - DC Bias Range: N/A
  - DC Input Range -22° F to 302° F (-30° to + 125° C)
  - AC Input Range: N/A

Ouput

- HART enabled, wireless, linear with velocity, temperature, and/or PeakVue
- The overall velocity measurement delivered over the 2Hz-1000Hz frequency range per the ISO 10816 standard.
- The PeakVue value delivered as peak-to-peak acceleration value based on a 1000Hz high-pass filter

Local Display

- The optional five-digit integral LCD Meter can display engineering units (°F, °C, In/Sec, mm/sec and g's). Display updates at transmit rate up to once per minute

Humidity Limits

- 0–100% relative humidity

Temperature Limits

- Without LCD Meter Display

Operating Limit	Storage Limit
-32° F to 185° F	-32° F to 185° F
-40° C to 85° C	-40° C to 85° C

- With LCD Meter Display

Operating Limit	Storage Limit
-4° F to 185° F	-32° F to 185° F
-20° C to 85° C	-40° C to 85° C

Transmit Rate

- User selectable, 1 min to 60 min

A0394 Sensor Series

- Nominal Sensitivity
  25 mV/g (2.5mV/(m/s²)
- Frequency Range
  96 to 600k cpm (1.6 to 10k Hz)
- Amplitude Range
  ± 80 g (± 784 m/s²)
- Broadband Resolution
  3 mg rms (29 mm/s² rms)
- Settling Time
  ≤ 2 sec (≤ 2 sec)
- Temperature Range
  -65 to +250° F (-54 to +121° C)
- Connector Position
  Side (Side)
- Weight
  0.81 oz (23 gm)

Physical Specifications

Wireless Power Module

- Replaceable, intrinsically safe Lithium-Thionyl Chloride power module pack with PBT enclosure
- Power Module life – Transmit Rate
  - Active LCD Panel
    3.5 years : 30 minute transmit rate
    6 years: 60 minute transmit rate
  - No LCD Panel
    4 years: 30 minute transmit rate
    7 years: 60 minute transmit rate

Sensor Terminals

- Screw terminals permanently fixed to terminal block

HART Communicator Connections
Communication Terminals

- Clips permanently fixed to terminal block

Materials of Construction
Enclosure

- Housing - Low-copper aluminum
- Paint - Polyurethane
- Cover O-ring - Buna-N

Terminal Block and Battery Pack

- PBT

Antenna

- PBT/PC integrated omni directional antenna

Mounting

- Transmitters may be attached away from the asset to be monitored with the sensors mounted directly to the asset
- Mounting brackets also permit remote mounting. See the "Dimensional Drawings" section

Weight

- CSI 9420 without LCD - 4.6 lbs. (2 kg)
- CSI 9420 with M5 LCD - 4.7 lbs (2.1 kg)

Enclosure Ratings (9420)

- Housing option code D is NEMA 4X, and IP66

(1) Reference conditions are for one accelerometer connected at 70° F (21° C), and routing data for three additional network devices.

NOTE: Continuous exposure to ambient temperature limits (-40 °F or 185 °F) (-40 °C or 85 °C) may reduce specified battery life by less than 20 percent.

Performance Specifications

ElectroMagnetic Compatibility (EMC)

- All Models meets all relevant requirements of EN 61326.

Measurement Accuracy

- Parameter - Typical[2]
  - RMS Velocity +/- 0.4 dB (Corresponds to +/-4%)
  - PeakVue +/- 0.4 dB (Corresponds to +/- 4%)
  - Temperature +/- 4° C

NOTE: (1) Measurement accuracy is the absolute accuracy of the measurement relative to a known, calibrated excitation for WirelessHART devices.

(2) Typical measurement accuracy represents the expected performance operating under steady-state conditions (constant temperature at 20°C with no external interference) for a mid-band excitation (nominally 1 g at 100 Hz). This variation includes the frequency response of the electronics and the sensor

Measurement Precision

- Vibration: +/- 0.2 dB over 24 months
- Temperature: +/- 2 °C over 24 months.

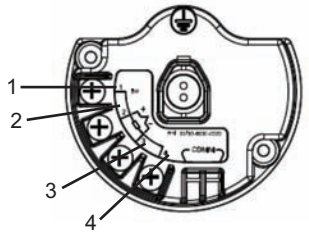
Self Calibration

- The analog-to-digital measurement circuitry automatically self-calibrates for each update by comparing the dynamic measurement to extremely stable and accurate internal reference elements

Vibration Effect

- No loss in functionality when tested per the requirements of IEC60770-1 with high vibration level (10 Hz to 10 Khz) and up to 50g acceleration

Sensor Connections



Connecting One Sensor to the CSI 9420

- Connecting One Sensor / accelerometer
  - Connector labeled 1 - Red wire
  - Connector labeled 2 - White wire
  - Connector labeled 3 - Blank
  - Connector labeled 4 - Black wire

Connecting Two Sensors to the CSI 9420

- Connecting Two Sensors / accelerometer
  - Connector labeled 1 - Two red wires (one from each sensor)
  - Connector labeled 2 - White wire from one sensor
  - Connector labeled 3 - White wire from other sensor
  - Connector labeled 4 - Two black wires (one from each sensor)

Connecting One Sensor with Temperature to the CSI 9420

- Connecting One Sensor accelerometer with temperature
  - Connector labeled 1 - Red wire
  - Connector labeled 2 - White wire
  - Connector labeled 3 - Green wire
  - Connector labeled 4 - Black wire

Product Certification and Registrations

General Certifications

Approved Manufacturing Locations
Emerson Process Management – Knoxville, Tennessee USA

Telecommunication Compliance

2.4 Ghz WirelessHART:
FCC ID: LW2RM2510
IC ID: 2731A-RM2510

900 Mhz:
FCC ID: SJC-M1030
IC ID: 5853A-M1030

ATEX Directive (94/9/EC)
Emerson Process Management complies with the ATEX Directive.

CE Compliant to Electro Magnetic Compatibility (EMC) (2004/108/EC)
All Models conforming to the following standards: EN 61326-1, 61326-2-3: 2006

Radio and Telecommunications Terminal Equipment Directive (R&TTE)(1999/5/EC)
Emerson Process Management complies with the R&TTE Directive.

Canadian Standards Association (CSA)
Certificate Number: 2008943
General Safety Standard Certification conforming to the following standards:
CSA Std. C22.;2 No. 61010-1-4 Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use, Part I : General Requirements (Second Edition)
ISA S82.02.01 2nd (IEC 61010-1 Mod) Safety Standards for Electrical and Electronic Test, Measuring, Controlling and Related Equipment – General Requirements
ANSI/UL Sta. 61010-1 Electrical Equipment for Measurement, Control and Laboratory Use: Part 1 General Requirements (Second Edition)

Hazardous Locations Certifications

Factory Mutual (FM) Approvals

2.4 GHz WirelessHart
Certificate Number: Pending

900 MHz
Certificate Number: 3032128

I5 FM Non-incendive
Zone Marking: Class I, Zone 2, Group IIC
Temperature Code T4 (-40°C < Ta < 85°C), (-20°C < Ta < 80°C with LCD)
Non-incendive for Class I, Division 2, Groups A, B, C, and D.
For use with Rosemount Power Module P/N 753-9220-XXXX (MHM P/N 89002) only
Enclosure Type 4X / IP66
Conforming to the following standards: FM 3600: Nov 1998, FM 3600: Nov 1998, FM 3611: Dec. 2004, FM 3810: Jan 2005

Canadian Standards Association (CSA)

2.4 GHz WirelessHART
Certificate Number: 1991246 (LR111518)

900 MHz
Certificate Number: 1991246

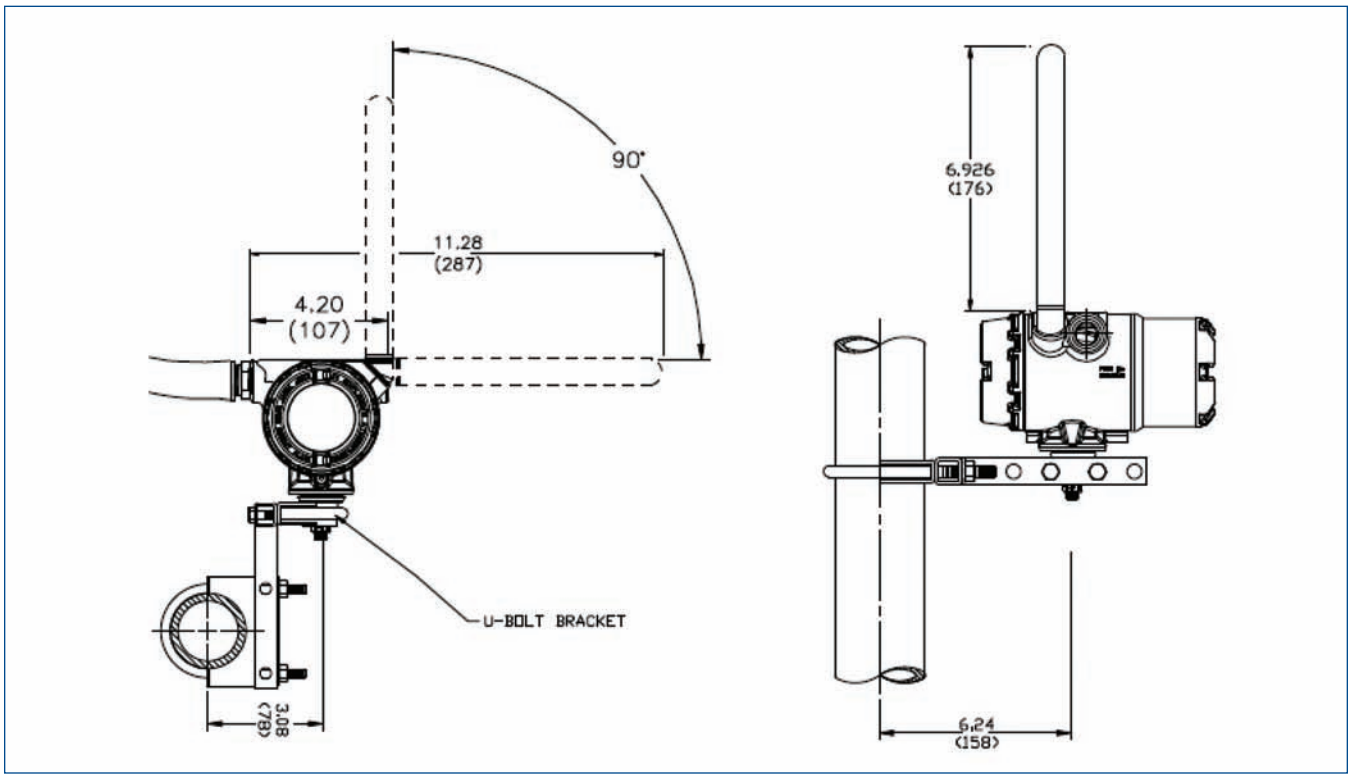
Temp Code T4 (-40°C < Ta < 85°C), (-20°C < Ta < 80°C with LCD)
Enclosure Type 4X / IP66
For use with Rosemount Power Module P/N 00753-9220-XXXX (MHM P/N 89002) only
Conforming to the following standards: CSA Std. C22.2 No. 0-M91, CSA Std. C22.2 No. 142-M1987, CSA Std. C22.2 No. 213-M1987

ATEX, Zone 2
2.4 GHz WirelessHART
Certificate Number: Pending

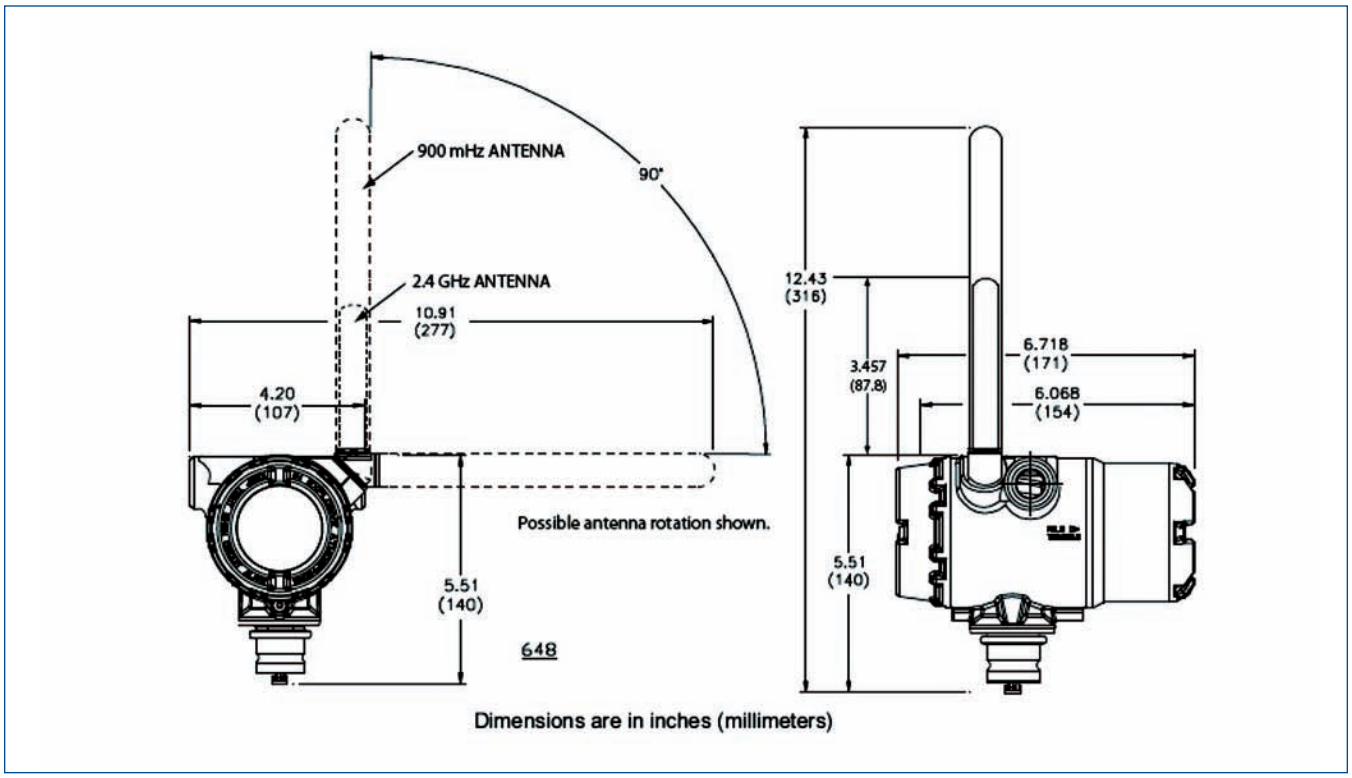
Ex II 3G Ex nA nL HC T4 (-40°C < 85°C), (-20°C < Ta < 80°C with LCD)
Enclosure Type IP66
For use with Rosemount Power Module P/N 753-9220-XXXX (MHM P/N 89002) only

Dimensional Drawings

CSI 9420 Remote Mount



CSI 9420 Dimensions



Ordering Information

Model	Product Description
9420	Wireless Vibration Transmitter
Code	**Transmitter Type**
D	Wireless Field Mount
Code	**Certifications**
1	Single Low Power Accelerometer
2	Dual Low Power Accelerometer
3	Single Low Power Accelerometer with Embedded Temperature
Code	**Housing**
D	Dual-Compartment Housing - Aluminum
E	Dual-Compartment Housing - Stainless Steel
Code	**Conduit Threads**
1	1/2-14 NPT
Code	**Certifications**
Q1	FM, Class 1 Division 2, Groups A,B,C,D; Temperature Code: T4 ($-40^{0}C \leq Ta \leq 85^{0}C$)
Q2	CSA, Class 1 Division 2, Groups A,B,C,D; Temperature Code: T4 ($-40^{0}C < Ta < 85^{0}C$)
Q3	ATEX Type n ExII 3G Ex nA nL HC T4 ($-40^{0}C \leq Ta \leq 85^{0}C$)
NA	No Approval
Code	**Wireless Options**
	Wireless Transmit Rate
WA	User Configurable Transmit Rate
	Operating Frequency and Protocol
1	2.4 GHz WirelessHART
2	900 MHz FHSS, HART Wireless
	Antenna
WK	Omnidirectional, Integral Antenna
	SmartPower™
1	Long-life Power Module Adapter, Intrinsically Safe NOTE: Power Module may be shipped separately- Order Part Number MHM-89002
	Meter
L	LCD Meter - Local Operator Interface
	Configuration
C1	Factory Configure Data, Descriptor, Message Fields, and Wireless Parameters NOTE: Requires completed configuration date sheet to be submitted with order
	Cable Gland
G1	Cable Gland for Single Sensor
G2	Cable Gland for Dual Sensor
G3	Cable Gland for Single Armor Cabled Sensor
G4	Cable Gland for Single Sensor - Stainless Steel Gland
G5	Cable Gland for Single Armor Cable Sensor - Stainless Steel Gland

Destination Country Code

Model	Destination Country
C01	Argentina
C02	Australia
C03	Brazil
C04	China
C05	Hong Kong
C06	India
C07	Japan
C08	Korea
C09	Malaysia
C10	Mexico
C11	Morocco
C12	Pakistan
C13	Singapore
C14	South Africa
C15	Taiwan
C16	UAE
C17	Ukraine

Typical Model Number: 9420 D 2 D 1 NA WA 1 WK 1 L C1 G2 C##

Sensor Ordering Information

Model	Sensor Description
A0394RI	Low Power Accelerometer, Right Angle, Green Jacket - 10' Cable
A0394RA	Low Power Accelerometer, Right Angle, Armor Jacket - 10' Cable
A0394RAC	Low Power Accelerometer, Right Angle, Armor Jacket w/ Teflon® Coating - 10' Cable
A0394DI	Low Power Accelerometer, w/ Temperature, Right Angle, Blue Jacket - 10' Cable
A0394DA	Low Power Accelerometer, w/ Temperature, Right Angle, Armor Jacket - 10' Cable
A0394DAC	Low Power Accelerometer, w/ Temperature, Right Angle, Armor Jacket w/ Teflon Coating - 10' Cable

For NA only, the above sensors are also available in 30’, 50’, 75’ and 100’ lengths.

For 30’ length, add “-1” to part number

For 50’ length, add “-2” to part number

For 75’ length, add “-3” to part number

For 100’ length, add “-4” to part number

Machinery Health™ Management

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The CSI 9420 Wireless Vibration Transmitter powers PlantWeb through predictive diagnostics to improve reliability and reduce operations and maintenance costs.

EMERSON™
Process Management